

24-AT-5990  
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Challberg

Serial No.: 09/692,135

Filed: October 19, 2000

For: CORE SUPPORT FOR AN F-LATTICE  
CORE OF A BOILING WATER  
NUCLEAR REACTOR

Art Unit: 3641

Examiner: J. Richardson

#17 / Key for  
Reconsideration  
Bentley  
9/29/03

REQUEST FOR RECONSIDERATION

Commissioner for Patents  
P.O. Box 1450  
Arlington, VA 22313

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The Office Action dated June 4, 2003 has been carefully reviewed and the following remarks are made in consequence thereof.

Claims 1-16 are pending in this application. Claims 1-4, 6-12, and 14-16 stand rejected. Claims 5 and 13 are withdrawn from consideration.

The rejection of Claims 1-4, 6, and 9-12 under 35 U.S.C. § 103(a) as being unpatentable over Dalke et al. (U.S. 5,519,746) is respectfully traversed.

Applicant submits that a *prima facie* case of obviousness has not been established. To establish a *prima facie* case of obvious, three basic criteria must be met. First the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated one skilled in the art to modify a reference or to combine references. See *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2nd 1596, 1598(Fed. Cir. 1988). Second, the proposed modification must have a reasonable expectation of success. See *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209, 18 U.S.P.Q.2nd 1016,

1023 (Fed. Cir. 1991). Third, the prior art reference or combination must teach or suggest all the limitations of the claims. See *In re Zurko*, 111 F.3d 887, 8889, 42 U.S.P.Q.2nd 1476, 1478 (Fed. Cir. 1997). And the teachings or suggestions, as well as the expectation of success, must come from the prior art, not the applicant's disclosure. See *In Re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2nd 1438, 1442 (Fed. Cir. 1991).

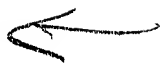
Particularly, there is no suggestion or motivation in the art for one skilled in the art to modify Dalke et al. to form the inter-bundle support plate 40 and the support cup 42 as a single support unit. The inter-bundle support plate 40 is an integral part of removable fuel assembly 14 and support cup 42 is permanently attached to core plate P (see Col. 4, lines 44-47 and Figure 5).

Dalke et al. describe at Col. 2, lines 17-20, that the lower section of the fuel channel has an attached inter-bundle fuel support to vertically hold the sub-fuel bundles, and that each channel and inter-bundle fuel support serves as a basket for the four sub-fuel bundles. Dalke et al. also describes at Col. 5, lines 18-22, that the entire assembly 14 is lifted from the support cup 42 during refuel and repair procedures (see also Figure 5). Applicants submit that forming the inter-

bundle support plate 40 and the support cup 42 as a single unit would prevent the fuel assembly from being lifted from the support cup as described and shown by Dalke et al. Particularly, it would prevent the fuel assembly from being removed from the reactor because the support cup is

fixed to the core plate P. Specifically, because the inter-bundle support plate 40 is attached to the channel 16, and because the handles are attached to the channel 16, the entire assembly 14 could not be lifted from the reactor during refuel and repair procedures if the inter-bundle

support plate 40 and the support cup 42 is formed as a single unit and attached to the core plate P, thus making inoperable an important function of the fuel bundle described by Dalke et al. The

Federal Circuit has opined that if a proposal for modifying the prior art in an effort to attain the claimed invention causes the art to become inoperable or destroys its intended function, then the requisite motivation to make the modification would not have existed. See *In re Fritch*, 972 F.2d 1260, 1265 n.12, 23 U.S.P.Q.2d 1780, 1783 n.12 (Fed. Cir. 1992). 

Further, Applicant submits that there is no motivation for one skilled in the art to modify Dalke et al. to form the inter-bundle support plate 40 and the support cup 42 as a single support unit because this modification would not solve the problem of flow separation and bi-stable flow caused when a fuel assembly is located above a beam support. In a description of a known fuel bundle support (Figure 5), page 7, lines 22-26, of the present application describes that

Because of the geometry of F-lattice core configuration 54, a core plate support beam 96 obstructs coolant flow inlet 84 of about 50% of fuel bundle supports 80 located on core plate 82. The obstruction of flow inlet 84 caused by support beam 96 can create flow separation and bi-stable flow which can influence the coolant flow pattern at both coolant flow inlet 84 and within fuel bundle 36.

Figure 6 of the present application illustrates a fuel bundle support in accordance with an embodiment of the present invention which overcomes this stated problem. The inlet of this embodiment is not obstructed when the fuel assembly is positioned over the support beam. Applicant submits that modifying Dalke et al. to form the inter-bundle support plate 40 and the support cup 42 as a single support would still result in the problem arrangement shown in Figure 5 of the present application. Accordingly, Applicant submits that for the reasons set forth above there is no motivation for one skilled in the art to modify Dalke et al. to form the inter-bundle support plate 40 and the support cup 42 as a single support unit.

Also, Applicant submits that there is no showing that the proposed modification has a reasonable expectation of success. One skilled in the art knows that fuel bundles need to be

removed from the reactor for refueling and maintenance purposes. Modifying Dalke et al. to form the inter-bundle support plate 40 and the support cup 42 as a single support unit would create a core plate with a non-removable fuel bundle which would be of no commercial use in a reactor.

Further, Applicant submits that Dalke et al. do not describe nor suggest a core plate assembly as recited in Claim 1 nor a core for a nuclear reactor as recited in Claim 9. Particularly, Dalke et al. do not describe nor suggest a plurality of fuel supports extending through the flat core plate with each fuel support including a coolant flow inlet, a coolant flow outlet sized to receive the lower tie plate of a fuel bundle, and a coolant flow bore extending between the coolant flow inlet and the coolant flow outlet such that the coolant flow inlet is offset from the coolant flow outlet. Rather, Dalke et al. describe a fuel assembly that is supported by a cup attached to the core plate. The cup has a coolant flow inlet, a coolant flow outlet, and a coolant flow bore extending between the coolant flow inlet and the coolant flow outlet. However, the coolant flow inlet and the coolant flow outlet are not offset from each other. Dalke et al. describe an inter-bundle support plate that includes a single inlet and four flow outlets that are offset from the inlet. But, Dalke et al. does not describe nor suggest that the inter-bundle support plate extends through the core plate. Page 8 of the Office Action dated 11/01/03 admits this. Rather, Dalke et al. describe that the inter-bundle support plate is supported by the cup (see Figures 4 and 5, and Col. 4, lines 44-55). Also, as shown in Figure 3, and described in Col. 2, lines 17-20, the inter-bundle support plate is part of the fuel assembly and not part of the core plate assembly.

Further, Dalke et al. does not describe nor suggest a plurality of support beams with the core plate P positioned on top of the support beams. Page 8 of the Office Action dated 11/1/03 suggests that the support cups 42 are "support beam type structures on top of the said plates". Applicant submits that if the support cups were the equivalent of support beams, the support cups are fixed to the top of the core plate and that the core plate is not positioned on top of these support cups.

Further, Applicant respectfully submits it appears that the Examiner has misunderstood Applicant's arguments from the statements supporting the Examiner's position at pages 3 and 4 of the current Office Action.

Particularly, the current Office Action states that "it is noted that the features which applicant relies (i.e., **prevent the fuel assembly from being lifted, lifting entire assembly, during refuel and repair procedures, extending through the flat core plate, removed from the reactor core**) are not recited in the rejected claim(s)". Applicant respectfully submits that with the exception of the fact that the inter-bundle support plate described in Dalke et al. does not extend through the flat plate of the core plate assembly, the rest of these features are directed to the non obviousness to modify Dalke et al. to form the inter-bundle support plate 40 and the support cup 42 as a single support unit. And as such these features do not need to be recited in the claims of Applicant's application.

Further, the current Office Action states that "the applicant's arguments that the cited art, Dalke et al., fails to disclose an apparatus that is capable of being **removed** form the reactor core . . .". Applicant respectfully submits that this statement does not reflect Applicant's arguments. Particularly in the Amendment filed 2/26/03, at page 6, Applicant argued that "Applicants submit

that forming the inter-bundle support plate 40 and the support cup 42 as a single unit would prevent the fuel assembly from being lifted from the support cup as described and shown by Dalke et al. Particularly, it would prevent the fuel assembly from being removed from the reactor because the support cup is fixed to the core plate P."

Further, The current Office Action states that "the amended claims 1, 9, do **not** cite whether the **plurality of beam supports** are located above or below the core support plate." Applicant respectfully submits that both Claim 1 and Claim 9 recite "said flat plate positioned on top of said support beams".

For the reasons set forth above, Applicant respectfully submits that a *prima facie* case of obviousness has not been established and that Claims 1 and 9 are patentable over Dalke et al.

Claims 2-4 and 6 depend from independent Claim 1 and Claims 10-12 depend from independent Claim 9. When the recitations of dependent Claims 2-4 and 6, and Claims 10-12 are considered in combination with the recitations of Claims 1 and 9 respectively, Applicant respectfully submits that Claims 2-4 6, and 10-12 likewise are patentable over Dalke et al.

For the reasons set forth above, Applicants respectfully request that the Section 103(a) rejection of Claims 1-4, 6, and 9-12 be withdrawn.

The rejection of Claims 7, 8, 15, and 16 under 35 U.S.C. § 103(a) as being unpatentable over Dalke et al. in view of Hirukawa (U.S. 5,267,286) is respectfully traversed.

As explained above Dalke et al. do not describe nor suggest a core plate assembly as recited in Claim 1 nor a core for a nuclear reactor as recited in Claim 9. Accordingly, independent Claims 1 and 9 are patentable over Dalke et al.

Hirukawa describe a fuel assembly having a water cross or water rod arranged between the fuel rods, an inside of the water cross or water rod being divided into a coolant rising passage and a coolant lowering passage, and a control guide tube disposed inside the water cross or water rod and extending along an axial direction of the water cross or water rod. The coolant rising passage has a coolant inlet port formed to a portion above or under a portion at which the fuel rods are supported by the lower tie plate. The control element guide tube has a coolant outlet port formed at that portion so that a coolant introduced into the coolant rising passage flows vertically upwardly, then turns and flows downwardly along the control element guide tube, and flows into an inside thereof through the coolant outlet port.

Hirukawa does not describe nor suggest a plurality of fuel supports extending through the flat core plate with each fuel support including a coolant flow inlet, a coolant flow outlet sized to receive the lower tie plate of a fuel bundle, and a coolant flow bore extending between the coolant flow inlet and the coolant flow outlet such that the coolant flow inlet is offset from the coolant flow outlet. Rather, Hirukawa describes fuel assembly nozzle 18 that includes a single inlet and four outlets. Fuel assembly nozzle attach to a fuel support that is inserted into a control rod drive housing.

Applicant submits that Dalke et al. and Hirukawa, alone or in combination, do not describe nor suggest a core plate assembly as recited in Claim 1 nor a core for a nuclear reactor as recited in Claim 9. Particularly, Dalke et al. and Hirukawa, alone or in combination, do not describe nor suggest a plurality of fuel supports extending through the flat core plate with each fuel support including a coolant flow inlet, a coolant flow outlet sized to receive the lower tie plate of a fuel bundle, and a coolant flow bore extending between the coolant flow inlet and the

coolant flow outlet such that the coolant flow inlet is offset from the coolant flow outlet.

Further, Dalke et al. and Hirukawa, alone or in combination, do not describe nor suggest a plurality of support beams with the flat core plate positioned on top of the support beams.

Accordingly, Applicant submits that Claims 1 and 9 is patentable over Dalke et al. and Hirukawa, alone or in combination.

Claims 7 and 8 depend from independent Claim 1 and Claims 15 and 16 depend from independent Claim 9. When the recitations of Claims 7 and 8 and Claims 15 and 16 are considered in combination with the recitations of Claims 1 and 9 respectively, Applicant respectfully submits that Claims 7, 8, 15, and 16 likewise are patentable over Dalke et al. and Hirukawa, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103(a) rejection of Claims 7, 8, 15, and 16 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,



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